

A Stronghold of Native Biodiversity

Photo Gene Nieminen / USFWS, NJFO

Pinelands acidic, nutrient-poor water and bog asphodel (*Narthecium americanum*), a federal Candidate Species

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The Pinelands is one of the few areas in New Jersey that has resisted invasion by nonnative plant and animal species. In parts of the Pinelands, the species composition of aquatic and wetland communities is probably similar to what existed prior to European colonization. Fish assemblages, comprised of species such as the banded sunfish (*Enneacanthus obesus*) and the pirate perch (*Aphredoderus sayanus*), aquatic beds of swaying bulrush (*Scirpus subterminalis*) and seven-angled pipewort (*Eriocaulon aquaticum*), and populations of the Pine Barrens treefrog (*Hyla andersonii*) and carpenter frog (*Rana virgatipes*) characterize habitats where water quality has not been degraded by incompatible land uses. Although extensive areas of the region have maintained their ecological integrity, nonnative species have intruded on this unique ecosystem where the environmental barrier created by the acidic, nutrient-poor waters has been breached. Most invaders have come not from distant, exotic shores, but from other areas of New Jersey. At first glance, native species such as pumpkinseed sunfish (*Lepomis gibbosus*), bullfrog (*Rana catesbeiana*), and jewelweed (*Impatiens capensis*), may not appear to present a threat to the State's natural communities, but their presence in the Pinelands is indicative of habitat degradation.

Nearly one hundred years ago, Witmer Stone, a pioneer in the study of Pinelands vegetation, noted that species native to surrounding areas invaded the Pinelands where settlements were established and extensive clearings were created. Today, Pinelands streams and stream banks in heavily altered watersheds are dominated by aquatic and wetland plants that are more typical of adjacent geographic regions.

Nutrient enrichment, elevated pH, and sedimentation are associated with the presence of non-Pinelands species, such as jewelweed, smartweeds (*Polygonum* spp.), and broad-leaved cattail (*Typha latifolia*), and the general absence of characteristic Pinelands plants. Interestingly, some true exotics, such as purple loosestrife (*Lythrum salicaria*), are not frequently encountered in the region's freshwater wetlands and do not pose the same threat they do to other regions. One exception is Japanese stilt grass (*Microstegium vimineum*), an invasive exotic that has been found out-competing all other species at some Pinelands sites.

Native Pinelands fish communities are one of the rarely mentioned jewels of New Jersey. The native fish fauna comprises 14 species. Except for the ironcolor shiner (*Notropis chalybaeus*), which is rarely encountered, these native species are widely distributed throughout the region. Fishes most closely associated with the Pinelands include the blackbanded sunfish (*Enneacanthus chaetodon*), admired for its beauty by European fish hobbyists, and the chain pickerel (*Esox niger*), the region's only native gamefish. Past attempts to introduce nonnative gamefish to the Pinelands were generally successful only where development and agricultural activities changed the natural water chemistry. Species not native to New Jersey, such as the largemouth bass (*Micropterus salmoides*) and the bluegill (*Lepomis macrochirus*), and species native to other areas of the State, including the brown bullhead (*Ameiurus nebulosis*) and the tessellated darter (*Etheostoma olmstedii*), are usually found only in degraded waters with elevated pH. Although the jury is still out on whether the presence of these

nonindigenous species is associated with a decline in characteristic Pinelands fishes, the special quality of native communities is lost when nonnatives are present.

The bullfrog, another Pinelands invader, can usually be heard calling at impoundments where largemouth bass and bluegills are found. Bullfrogs have been implicated in the decline of native frogs in other areas of the United States, and there is strong evidence that the carpenter frog is absent from impoundments where bullfrogs dominate. It is not known if the absence of the native carpenter frog is due to predation or competition by bullfrogs or to the presence of predatory nonnative fish and associated habitat degradation. Other non-Pinelands frog species, such as the New Jersey chorus frog (*Pseudacris triseriata*), may also be found at intermittent ponds near disturbed landscapes.

The Pinelands experience demonstrates the ecological importance of maintaining natural landscapes. Protecting the region's special water-quality conditions from incompatible land uses is essential to preventing the invasion of natural communities by non-Pinelands species and preserving one of New Jersey's last strongholds of native biodiversity. Degrade the water and they will come.



Batsto River in the Pinelands

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